



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,737	06/19/2006	Kazushi Yamanka	278810US2X PCT	8351
22850	7590	06/25/2009		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
SAKELARIS, SALLY A				
ART UNIT		PAPER NUMBER		
1797				
NOTIFICATION DATE		DELIVERY MODE		
06/25/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary

Application No.

10/550,737

Applicant(s)

YAMANAKA ET AL.

Examiner

Sally A. Sakelariss

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 10-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/26/2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-850)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 11/1/2005 and 12/27/2005

DETAILED ACTION

Election/Restrictions

Applicant's election of Group I claims 1-9 in the reply filed on 5/28/2009 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on March 26, 2003. It is noted, however, that applicant has not filed a certified copy and an English translation of the Japanese application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-9 are rejected under 35 U.S.C. 102(a) as being anticipated by Yamanaka et al. (10/2003 IEEE Ultrasonics symposium, pgs 299-301).

With regard to claim 1, Yamanaka et al. teach a sensor head, comprising:

a three-dimensional base body having a curved surface allowing definition of a circular orbital band;

an electroacoustic transducer arranged on the orbital band of the three-dimensional base body, configured to excite surface acoustic wave to perform multiple roundtrips along the orbital band; and

a sensitive film at least a part of which is formed on at least a part of the orbital band of the three-dimensional base body, configured to react with a specific gas molecule (Figures 1 and 2).

With regard to claim 2, Yamanaka teach the orbital band is defined on the surface of the outer periphery of the three-dimensional base body (Figure 1).

With regard to claim 3, Yamanaka teach the orbital band is defined on the interior face of a cavity of the three-dimensional base body (Figure 3).

With regard to claim 4, Yamanaka teach the thickness of the sensitive film is 100 nanometers or less (Abstract teaches 20nm).

With regard to claims 5 and 6 Yamanaka teach respectively that the thickness of the sensor head film to be less than both $1/500^{\text{th}}$ and $1/1000^{\text{th}}$ of the wavelength of the surface acoustic wave. Yamanaka teach that in the study they used a 10mm ϕ ($a=5$ mm) quartz ball and apply lithography with line and space of 17.5 μm . As a result, the wavelength (λ) is taught to be 70 μm (pg. 300 bottom left). One five hundredth of 70 μm is 0.14 μm (140nm). One thousandth of 70 μm is 0.07 μm (70nm). Yamanaka teaches that the thickness of the Pd film "was as thin as 20nm" which is less than both .07 μm (70nm) and 0.14 μm (140nm).

With regard to claim 7, Yamanaka et al. teach the sensor head of claim 1, wherein the sensitive film is a film containing palladium (Hydrogen Sensor design II, page 301).

With regard to claims 8 and 9, Yamanaka teach the sensor of claim 1 wherein a temperature sensor in the form of a semi rigid thermocouple including a resistance detection pattern on the surface of the three-dimensional base body configured to measure the surface temperature (Experimental Results III, Pg 301 Rt. side).

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

2. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsukahara et al. (US 6566787).

With regard to claim 1, Tsukahara et al. teach a sensor head, comprising:
a three-dimensional base body (Figure 1, (10)) having a curved surface allowing definition of a circular orbital band (12b);
an electroacoustic transducer (14) arranged on the orbital band of the three-dimensional base body, configured to excite surface acoustic wave to perform multiple roundtrips along the orbital band; and
a sensitive film (14a) at least a part of which is formed on at least a part of the orbital band of the three-dimensional base body, configured to react with a specific gas molecule (Figures 1).

With regard to claim 2, Tsukahara teach the orbital band is defined on the surface of the outer periphery of the three-dimensional base body (Figure 1).

With regard to claim 3, Tsukahara teach the orbital band is defined on the interior face of a cavity of the three-dimensional base body (Figure 6, carrelled cavity 61 with inner surface including 12c).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 4-7 are rejected under 103(a) as being unpatentable over Tsukahara et al.(US 6566787) in view of Tom (US 6029500).

With regard to claims 4-7 Tsukahara et al. teach that the piezoelectric film provided at a predetermined position on the out surface can be prepared by all the currently known methods (Col. 11 lines 1-3).

With regard to claims 5 and 6 Tsukahara teach respectively that the thickness of the sensor head film is $1/500^{\text{th}}$ and $1/1000^{\text{th}}$ of the wavelength of the surface acoustic wave or less. Tsukahara teach that the wavelength (λ) of the surface acoustic wave to be between 100-800 μm

(Col. 3 line 53). Using $\lambda = 100 \mu\text{m}$ as the most stringent pole of the range, one five hundredth of $100 \mu\text{m}$ is $0.2 \mu\text{m}$ (200nm). One thousandth of $100 \mu\text{m}$ is $0.1 \mu\text{m}$ (100nm).

Tsukahara et al. do not teach the film to have any particular thickness and does not teach that the film consists of palladium.

Tom teaches a piezoelectric quartz crystal hydrogen surface acoustic wave device sensor having a thin film of the thickness of 100nm coating thereon of a hydrogen-interactive metal such as palladium (Abstract and Fig.1).

Therefore, with regard to claim 5 and 6, Tom teach a thickness of the thin film that is $1/500^{\text{th}}$ and $1/1000^{\text{th}}$ of the wavelength of the surface acoustic wave since 100 nm in film thickness is equal to or less than $\lambda/500 = 200\text{nm}$ and $\lambda/1000 = 100\text{nm}$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a Pd composition and such a thickness for the thin film, since Tom teaches that such a composed sensor “relates to a high sensitivity, high selectivity hydrogen gas sensor that is usefully employed in environments including those that have posed difficulties previously such as those containing other oxidizing species as well as in inert gases”(Col. 1 lines 48-53).

4. Claims 8 and 9 are rejected under 103(a) as being unpatentable over Tsukahara et al.(US 6566787) in view of Bartley et al. (US 6060692).

Tsukahara et al. do not teach a temperature sensor or resistive heating element on their SAW sphere transducer.

Bartley et al. teach a low power compact resistive heater (18) and sensor (Not shown but referenced in Col. 5 line 4) for piezoelectric devices (Figure 3).

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to choose to add the sensor and resistance detection pattern of Tom to the spherical SAW device of Tsukahara for the expected benefit that the Tom device does not require special processing and maintains its inherent performance and frequency stability therefore not having a size or cost penalty (Col. 2 lines 5-11).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sally A. Sakelaris whose telephone number is 5712726297. The examiner can normally be reached on Monday-Friday 8-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 5712721267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sally Sakelaris

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797